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| 10/081,247 | 02/22/2002 | Robert L. Gerlach | F073 | 9793 |
| 25784 | 7590 | 10/06/2003 | EXAMINER | |
| MICHAEL O. SCHEINBERG P.O. BOX 164140 AUSTIN, TX 78716-4140 | | | TRAN, CHUC | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2821 | |

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/081,247

Applicant(s)

GERLACH ET AL.

Examiner

Chuc D Tran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-5, 20-24 and 29-35 is/are allowed.
- 6) ☒ Claim(s) 6-19, 25-28 and 36-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 8-19, 25-28, 36, 37 and 39 are withdrawn in view of the newly discovered reference(s) to Murakoshi et al (USP. 6,476,390). Rejections based on the newly cited reference(s) follow.

Response to Arguments

1. Applicant's arguments with respect to claims 1-39 have been considered but are moot in view of the new ground(s) of rejection.

Double Patenting

Claims 8, and 10-11 are objected to under 37 CFR 1.75 as being a substantial duplicate of claims.

As to claim 8, the recitation "each of the electron optical columns further includes at least one electron optical element that is within the system vacuum chamber" is already provided in claim 7. Also to claims 10 and 11, the recitation "each of the multiple electron gun is contained within its own sealable gun chamber or each of the sealable gun chambers includes multiple electron guns" is already provided in claim 9.

When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Drawings

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2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "the lower deflection elements" in claim 37, line 3 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

1. Claims 1, 4, 6, 12, 23, 28-35, and 37 are objected to because of the following informalities:

Claim 1, Line 9, change "an" (electron gun chamber) to - - the - -;

Claim 4, Line 1, delete "the" (multiple electron guns);

Claim 6, line 3, change "a" (target) to - - the - -;

Claim 7, line 1, delete "the" (multiple);

Claim 11, line 1, change "the" (sealable) to - - a - -;

Claim 12, line 1, delete "the" (multiple);

Claim 12, Line 2, change "an" (electron optical columns) to - - the - -;

Claim 16, line 2, delete "the" (multiple);

Claim 23, line 2, change "an" (emitter) to - - the - -, change "a" (suppressor) to - - the - -, change "an" (extractor) to - - the - -;

Claim 25, line 5, delete "with";

Claim 28, line 2, delete "the" (multiple);

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Claim 28, line 5, change “a” (target) to - - the - -;

Claim 29, line 4, change “a” (sealable) to - - the - -;

Claim 29, line 7, change “an” (electron beam system) to - - the - -;

Claim 30, line 1, change “a” (sealable) to - - the - -;

Claim 31, line 2, change “a” (sealable) to - - the - -;

Claim 32, line 1, change “the” (emitter) to - - an - -;

Claim 33, line 1, change “a” (sealable) to - - the - -;

Claim 34, line 1, change “an” (electron) to - - the - -;

Claim 34, line 3, change “a” (system) to - - the - -, change “a” (target) to - - the - -;

Claim 35, line 3, change “an” (electron) to - - the - -;

Claim 37, line 3, add - - the - - (multiple electron column);

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 36, is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 36, the recitation “a method of replacing an electron source in a multiple electron beam system including...the method comprising” renders the claim indefinite as it does not provide any steps how to replace the electron source in the multiple electron beam system. Clarification is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 6-19, and 25-28, and 36-38 rejected under 35 U.S.C. 102(e) as being anticipated by Murakoshi et al (USP. 6,476,390).

Regarding claims 6-19, Murakoshi disclose a multiple electron beam system comprising:

- a system vacuum chamber (200), a target (10);
- multiple electron guns are positioned within a sealable gun chambers (51, 52, 53)

(col. 6, Line 8) (Fig. 1) (Col. 9, Line 58); and

- the multiple electron guns are positioned within the intermediate chamber (102)

without being placed in a sealable chamber within the intermediate chamber (Fig. 1);

- an optical column (51) includes an electron optical element (2) (Fig. 1) (Col. 6, Line 20);

- a intermediate chamber (102) in selectively communication with the system vacuum chamber through vacuum isolation valves (46, 47) (Fig. 1) (Col. 9, Line 31);and

- the sealable gun chamber has an associated vacuum pump for evacuating the chamber (Col. 2, line 18).

Regarding claims 25-28, Murakoshi disclose a multiple electron beam system comprising:

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- a system vacuum chamber (200), a target (10) (Fig. 1);
- a intermediate chamber (102) in selectively communication with the system vacuum chamber through vacuum isolation valves (46, 47) (Fig. 1) (Col. 9, Line 31);and
- the sealable gun chamber has an associated vacuum pump for evacuating the chamber (Col. 2, line 18).
- multiple electron guns are positioned within a sealable gun chambers (51, 52, 53) (col. 6, Line 8) (Fig. 1) (Col. 9, Line 58); and
- the multiple electron guns are positioned within the intermediate chamber (102) without being placed in a sealable chamber within the intermediate chamber (Fig. 1);
- an optical column (51) includes an electron optical element (2) (Fig. 1) (Col. 6, Line 20);
- the optical elements (4) to focus and direct the electron beam toward the target (10) (Col. 11, line 5).

Claim 36, the limitation concerning “replacing an electron source” is improper because it is a method step recited in an apparatus claim. Therefore the limitation “replacing an electron source” has not been considered.

Regarding claim 36, Murakoshi disclose a multiple electron beam system comprising:

- a system vacuum chamber (200), a target (10) (Fig. 1);
- multiple electron guns are positioned within a sealable gun chambers (51, 52, 53) (col. 6, Line 8) (Fig. 1) (Col. 9, Line 58); and
- the multiple electron guns are positioned within the intermediate chamber (102) without being placed in a sealable chamber within the intermediate chamber (Fig. 1);

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- a intermediate chamber (102) in selectively communication with the system vacuum chamber through vacuum isolation valves (46, 47) (Fig. 1) (Col. 9, Line 31);and
- the sealable gun chamber has an associated vacuum pump for evacuating the chamber (Col. 2, line 18).

Regarding 37, Murakoshi disclose a multiple electron column comprising:

- the multiple electron column (51, 52, 530 (Fig. 1);
- a lower deflection elements (8a, 8b, 8c) (Fig. 1) (Col. 8, Line 63).

Regarding claim 38, Murakoshi disclose a method of focusing electron columns in a charged particle beam system comprising:

- applying a small voltage to deflector (8) (Col. 9, Line 5) that are positioned above the objective lens (4) (Fig. 1).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakoshi.

Regarding claim 39, Murakoshi disclose an electron gun comprising emitter for emitting electrons (Col. 3, line 47), an extractor (19) (Col. 8, Line 60), a first gun lens element (2) (Fig. 1). However, Murakoshi is silent on the limitation of a suppressor for suppressing the emission of undesirable electrons. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Murakoshi by using a suppressor for suppressing the

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undesirable electrons around the electron beam source with a very high degree of vacuum in the chamber. The ordinary artisan would have been motivated to modify Murakoshi in the manner described above for operating the field emission type electron beam source in a stable manner. Since it was known in the art (See. Col. 1, line 53).

Allowable Subject Matter

8. Claims 1-5, 20-24, and 29-35 are allowed.

9. The following is an examiner's statement of reasons for allowance:

The prior art of record fails to appreciate the advantage offered by an electron beam system with the following distinctive features such as set by all of the independent claims. In particular, the art of record fails to teach or fairly suggest constructing the gun chamber vacuum isolation valve for vacuum isolating the gun chamber so that the intermediate chamber can be opened to replace the electron gun chamber without exposing the interior of the remaining electron gun chambers to the air to include a suppressor adjacent to the emitter for suppressing the unwanted emission of electrons, and a method of inserting the sealed gun chamber into the electron beam system posses all of the distinctive features such as defined by independent claims 1, 20 and 29 to provide the pattern inspection can be performed at a high speed and with high accuracy.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Citation of relevant prior art

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prior art Meisburger et al (USP. 5,502,306) disclose an electro beam system.

Prior art Livesay (USP. 6,407,399) disclose an uniformity correction for large area electron source.

Prior art Kawasaki et al (USP. 4,945,247) disclose a field emission electron gun system.

Prior art Yamazaki et al (USP. 5,528,034) disclose a method of ultra high sensity hydrogen detection.

Prior art Livesay (USP. 5,003,178) disclose a large area uniform electron source.


Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuc D Tran whose telephone number is (703)306-5984. The examiner can normally be reached on M-F Flex hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (703)308-4856. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

TDC
September 13, 2003


Don Wong
Supervisory Patent Examiner
Technology Center 2800